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(71) Applicant *(for all designated States except US)*: SONERA OY [FI/FI]; Sturenkatu 16, FIN-00510 Helsinki (FI).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: ALA-LUUKKO, Sami [FI/FI]; Paraistentie 18 A 2, FIN-00280 Helsinki (FI). HUOPANIEMI, Juho [FI/FI]; Ruutikellarinkuja 4 B 18, FIN-02600 Espoo (FI). PERÄ, Olli [FI/FI]; Candelinintie 4 B 5, FIN-90570 Oulu (FI).

(74) Agent: PAPULA REIN LAHTELE OY; Fredrikinkatu 61 A, P.O. Box 981, FIN-00101 Helsinki (FI).

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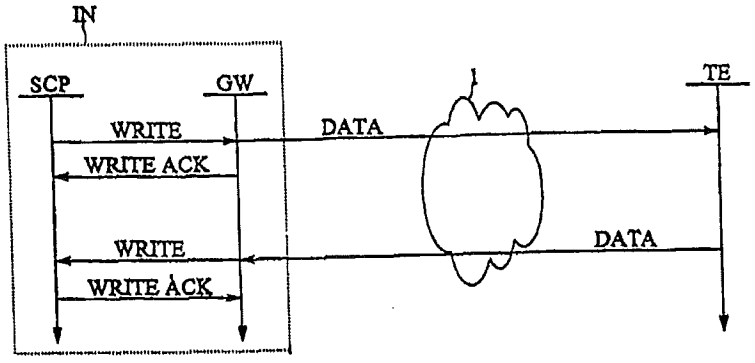

(57) Abstract

The invention relates to a method and system for modifying and transmitting intelligent-network service data or service parameters in a telecommunication system comprising an intelligent network (IN), a service control point (SCP) comprised in the intelligent network, a service data point (SDP) comprised in the intelligent network, a second telecommunication network (1) and means for connecting the intelligent network to the second telecommunication network. According to the invention, the second telecommunication network (1) is connected via a gateway (GW) to the service logic of the service control point (SCP) and/or to the service data point (SDP) and a service data parameter and/or the service logic of the intelligent network is modified by using a protocol supported by the second telecommunication network. The system comprises a gateway (GW) for connecting the second telecommunication network to the service logic of the service control point (SCP) and/or to the service data point (SDP) and means (9, 14) for modification of a service data parameter and/or the service logic of the intelligent network by using a protocol supported by the second telecommunication network (1).

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METHOD AND SYSTEM FOR THE TRANSMISSION AND MODIFICATION OF INTELLIGENT NETWORK PARAMETERS

The present invention relates to telecommunication systems. In particular, the invention relates to a method and system for modification or transmission of intelligent network service data or service data parameters by means of another telecommunication network.

At present, there is a large variety of services available in both wired and mobile telephone networks in respect of the options provided by the operator of the wired or wireless telephone network. These services may include e.g. permanent or remotely controlled call transfer, call waiting, suppression of number display, advance notice of billing to the subscriber and similar services. For the subscriber, the use of these services is optional, i.e. the subscriber can decide when to use each service. In addition, intelligent network systems use a number of other parameters that are preferably modified directly by the subscriber without requiring any action by the teleoperator or service provider, which would necessitate employment of resources in customer service.

In prior art, a system is known in which the parameters of intelligent network services are modified via an Internet access. The implementation requires that the user have an Internet access available. Another prior-art solution is the use of a menu service based on tone frequency signals. The problem is that the solution involves a difficult user interface and is slow in use. Moreover, long number sequences are difficult to visualise. The SSP centres used in intelligent network applications are usually not able to identify tone frequency signals during a call but only during call setup.

The CAMEL architecture involves a USSD-based user interface. The CAMEL architecture (CAMEL, Customised Applications for Mobile Network Enhanced Logic) is used to provide operator-specific intelligent network services even for subscribers who have moved outside the mobile communication network of their home operator under the international roaming system. USSD operations (USSD, Unstructured Supplementary Service Data) can be used to transmit unstructured supplementary service data between a mobile station and the telecommunication network. The USSD-based user interface used in conjunction with the CAMEL architecture requires that the service control point of the mobile communication network support the MAP interface (MAP, Mobile Application Part) in question.

The object of the present invention is to eliminate or at least significantly reduce the drawbacks listed above. A specific object of the present invention is to disclose a new type of method and a new type of system that enable the user to control intelligent network services by means of a terminal device connected to another telecommunication network.

As for the features characteristic of the invention, reference is made to the claims.

The invention relates to a method for modifying and transmitting intelligent network service data or service parameters in a telecommunication system comprising an intelligent network, a second telecommunication network and means for connecting the intelligent network to the second telecommunication network. The intelligent network comprises a service control point and a service data point. In the method of the invention, the second telecommunication network is connected via a gateway to the service logic of the service control point (SCP) and/or to the service data point (SDP). A service data parameter and/or the service logic of the intelligent network is modified by

using a protocol supported by the second telecommunication network. In a preferred case, a conversion between a fixed-format message as used in the second telecommunication network and a message supported by the intelligent network is performed by using a table in the gateway.

In a preferred embodiment, the service data parameter and/or the service logic are/is modified via a write operation performed by the gateway in the service logic of the service control point and/or in the service data point. The second telecommunication network according to the invention is preferably an IP-based (IP, Internet Protocol) network, e.g. the Internet, or a digital mobile communication network, such as the GSM network (GSM, Global System for Mobile Communications).

Moreover, the invention relates to a method in which, in a telecommunication system as described above, the second telecommunication network is connected via the gateway to the service logic of the service control point of the intelligent network and the intelligent network service data parameter or service logic is modified by using a protocol supported by the second telecommunication network. In an embodiment of the method, a conversion between a fixed-format message as used in the second telecommunication network and a message supported by the service control point of the intelligent network is performed by using a table in the gateway. The service data parameter and/or service logic is preferably modified via a write operation performed by the gateway in the service logic of the intelligent network service control point.

The invention also relates to a method for modifying an intelligent network service parameter in a telecommunication system as described above. In the method, the service parameter is transmitted using a

terminal device in the form of a text message to the gateway, the text message is converted in the gateway into the form of an intelligent network service parameter and transmitted to the data point of the intelligent network. In an embodiment of the method, an acknowledgement message is returned from the intelligent network data point to the gateway, the acknowledgement message is converted into the form of a text message and sent to the terminal device. The record to be modified in the intelligent network data point is preferably identified in the gateway by the calling subscriber number transmitted in the text message signalling. In an embodiment, the record to be modified in the intelligent network data point is identified in the gateway by the contents of the text message.

In an embodiment, the information is transmitted between the terminal device and the gateway in the form of a short message, in another embodiment by using the USSD-MAP protocol and in yet another by using the WAP protocol (WAP, Wireless Application Protocol). In the GSM mobile telephone system, the short-message service allows transmission of text messages from a mobile station to another even if the receiver is not reachable at the time. A text message sent as a short message may have a maximum length of 160 characters. The WAP protocol defines a standard for applications that provide services for wireless network terminal equipment. By using the WAP, it is possible to connect e.g. with Internet servers by telephone.

The invention also relates to a telecommunication system for modification and transmission of intelligent network service data or service parameters, said system comprising an intelligent network, a second telecommunication network and means for connecting the intelligent network to the second telecommunication network. The intelligent network comprises a service control point and a service data point. The

system comprises a gateway for connecting the second telecommunication network to the service logic of the service control point and/or to the service data point of the intelligent network and means for modification of a service data parameter and/or the service logic of the intelligent network by using a protocol supported by the second telecommunication network. In an embodiment, the gateway comprises table means for performing a conversion between a fixed-format message supported by the second telecommunication network and a message supported by the intelligent network. The gateway preferably comprises means for carrying out a write operation in the service logic of the service control point or in the service data point of the intelligent network and means for modification of the service data parameter and/or service logic. The second telecommunication network in the system of the invention is preferably e.g. an IP-based network or a digital mobile telephone network.

Moreover, the invention relates to a telecommunication system for modification of intelligent network services or service logic, said system comprising an intelligent network, a second telecommunication network and means for connecting the intelligent network to the second telecommunication network. The intelligent network comprises a service control point. The system comprises a gateway for connecting the second telecommunication network to the service logic of the service control point of the intelligent network and means for modification of a service data parameter and/or the service logic of the intelligent network by using a protocol supported by the second telecommunication network. The gateway preferably comprises table means for performing a conversion between a fixed-format message supported by the second telecommunication network and a message supported by the intelligent network. In an embodiment, the gateway comprises

means for carrying out a write operation in the service logic of the service control point of the intelligent network and means for modification of the service data parameter and/or service logic. The second telecommunication network in the system is preferably e.g. an IP-based network or a digital mobile telephone network.

The invention also relates to a telecommunication system for modification of a intelligent network service parameter, said system comprising an intelligent network, a digital mobile telephone network, means for connecting the intelligent network to the mobile telephone network, and terminal equipment connected to the mobile telephone network. The intelligent network comprises a service data point. The system comprises means for sending a service parameter in the form of a text message from the terminal equipment to a gateway, means for converting the text message in the gateway into the form of an intelligent network service parameter and transmitting it to the data point of the intelligent network. The system preferably comprises means for returning an acknowledgement message from the intelligent network data point to the gateway, means for converting the acknowledgement message in the gateway into the form of a text message and sending it to the terminal equipment.

In a preferred embodiment of the invention, the gateway comprises means by which the intelligent network data point record to be modified is identified by the calling subscriber number, i.e. A-number, transmitted in the text message signalling. In an embodiment, the system comprises means for identifying the record by the contents of the text message. The system preferably comprises means for transmitting information from the terminal equipment to the gateway e.g. in the form of a short message, using the USSD or the WAP protocol.

The invention enables the user interface between intelligent network services and the user to be implemented with the existing service development properties of the service control point. The user interface can be implemented more flexibly than by identification of tone frequency signals. Using the short message service, a mobile telephone subscriber can modify his/her services any time when reachable via the telecommunication network. The invention also permits communication between a GSM subscriber and an intelligent network in a network other than the GSM network, e.g. the service logic of a wired telephone network.

In the following, the invention will be described by referring to the attached drawings, wherein

Fig. 1 presents an example of signalling according to the present invention;

Fig. 2 presents an example of signalling according to another embodiment;

Fig. 3 presents a diagram representing a system according to the invention.

The diagram in Fig. 1 presents an example illustrating the signalling between the service control point SCP and the user's terminal equipment TE. The gateway GW comprises means for its connection to the service control point SCP and to the second telecommunication network 1. The second telecommunication network 1 may be e.g. a digital mobile communication network or the Internet. When the service control point SCP sends information or a request to the terminal equipment TE, it is transmitted to the gateway GW e.g. using a WRITE message. If the gateway GW supports transmission of information e.g. in text form, then the service control point can generate this type of information itself. In this case, the gateway GW will only have to convert this information into a form compatible with the properties of the second telecommuni-

cation network 1. In an embodiment, the service control point SCP indicates, using a suitable indicator, e.g. a number, a list in the gateway GW to define what sort of message is being transmitted. This procedure provides an advantage when the gateway GW applied does not support any other form of transmission of numeric data. The gateway sends the information DATA via the second telecommunication network 1 to the terminal equipment TE.

To transmit information DATA from the user's terminal equipment TE to the service control point SCP, the user applies network-specific properties. For instance in the GSM system, such a property may be a short message or USSD. The second telecommunication network 1 transmits this information DATA to the gateway GW, which modifies it into a database interface operation understood by the service control point SCP. If the service control point SCP does not support transmission of other than numeric information, then the gateway GW may be provided with a table serving to convert fixed-format messages into database interface operations.

Fig. 2 presents an example of signalling according to the invention, where an intelligent network service parameter is changed via the short-message service of a digital mobile telephone network. The user sends a short message to a service number. The short message contains fixed-format information for modifying the service parameter. For example, the letter 'D' means deactivating the intelligent network service parameter and 'A' means activating it. In the operator's network, the short message is transmitted to the gateway GW, which updates the relevant data in the database of the service data point SDP. A subscriber in the digital mobile telephone network sends a short message, which is transmitted in accordance with the GSM standard to a short message service cen-

tre SC. The short message service centre SC sends the message to the SMS-GMSC, which performs an HLR enquiry based on the B-number defined by the subscriber. The HLR (Home Location Register) is e.g. a GSM system database containing information including subscriber data, subscriber location data, call control data, short-message services and billing data. `B-number' means the receiver of the short message.

In this situation, the subscriber has selected a B-number value that points to a specific gateway GW. The gateway GW receives the short message sent by the SMS-GMSC and examines the A-number contained in it to determine the subscriber whose intelligent network parameters it has to change. By using this information and analysing the contents of the short message, the gateway GW knows which record in the database of the service data point SDP it has to change. After this, the gateway GW performs a WRITE operation that the service data point in question will understand. Next time when the intelligent network service is activated, the service control point SCP can check the user-defined parameter value in the service data point SDP.

Fig. 2 represents exchange of messages between the HLR of the SMS-GMSC and the gateway GW in accordance with the GSM MAP protocol. Between the gateway GW and the service control point SCP, the write operation of the database interface being used is applied. The two bottommost messages in the figure are applied if the calling subscriber is to be given optional information as to whether the database write operation was successful (as in the figure) or not.

In an embodiment of the invention, the gateway GW is also able to respond to an MAP-SendRoutingInfoForSM enquiry with its own address, in which case the SMS-GMSC sends the short message to the

gateway GW. All the functionalities associated with the service are now in the same database interface.

Fig. 3 is a diagrammatic representation of a system according to the invention. The terminal device TE is connected via the second telecommunication network to the gateway GW. The terminal equipment TE comprises means 13 for transmitting a service parameter in the form of a text message SMS to the gateway GW. The text message SMS may be a short message or e.g. a message consistent with the USSD or the WAP protocol, a byte-oriented or document-oriented message. The gateway GW is connected to the network components comprised in the intelligent network IN, the service control point SCP and the service data point SDP.

The gateway GW comprises means 9 and 14 for modification of an intelligent network service data parameter and/or service logic by using a protocol supported by the second telecommunication network 1. In addition, the gateway GW comprises table means 10 for performing a conversion between a fixed-format message supported by the second telecommunication network and a message supported by the intelligent network. Means 11 are used to carry out the write operation and means 12 to modify the data in the service logic of the service control point SCP and/or in the service data point SDP. Using means 15, the service data point returns an acknowledgement message to the gateway GW, which comprises means 16 for converting the acknowledgement message further into text message form and sending it to the terminal equipment TE. Means 19 are used to transmit information between the terminal equipment TE and the database interface in the form of a short message, means 20 using the USSD protocol and means 21 using the WAP protocol. To identify the record to be modified in the service data point SDP, the gateway GW uses means 17 for identifi-

cation by the A-number and means 18 for identification by the contents of the text message.

The function of the gateway GW is seen by the service control point SCP as a function resembling the service data point SDP. The data flowing through the database interface is simple numeric data, which is converted by the gateway GW into a fixed-format message and applied to the interface connecting to the second telecommunication network. The gateway may be an independent device or it may form a part of the service control point SCP or the service data point SDP. The invention can be implemented in many types of systems supporting SS7 or other protocols.

The invention is not restricted to the examples of its embodiments described above, but many variations are possible within the scope of the inventive idea defined by the claims.

CLAIMS

1. Method for modifying and transmitting intelligent-network service data or service parameters in a telecommunication system comprising an intelligent network (IN), a service control point (SCP) comprised in the intelligent network, a service data point (SDP) comprised in the intelligent network, a second telecommunication network (1) and means for connecting the intelligent network to the second telecommunication network, characterised in that the second telecommunication network (1) is connected via a gateway (GW) to a service logic system in the service control point (SCP) and/or to the service data point (SDP) of the intelligent network and a service data parameter and/or the service logic of the intelligent network is modified by using a protocol supported by the second telecommunication network.

2. Method as defined in claim 1, characterised in that a conversion between a fixed-format message as used in the second telecommunication network (1) and a message supported by the intelligent network (IN) is performed by using a table in the gateway (GW).

3. Method as defined in claim 1 or 2, characterised in that the service data parameter and/or the service logic are/is modified via a write operation performed by the gateway (GW) in the service logic of the service control point (SCP) and/or in the service data point (SDP).

4. Method as defined in any one of claims 1 - 3, characterised in that the second telecommunication network (1) is an IP-based network.

5. Method as defined in any one of claims 1 - 4, characterised in that the second telecommunication network (1) is a digital mobile telephone network.

6. Method for modifying intelligent network services or service logic in a telecommunication system comprising an intelligent network (IN), a service control point (SCP) comprised in the intelligent network, a second telecommunication network (1) and means for connecting the intelligent network to the second telecommunication network, characterised in that the second telecommunication network (1) is connected via a gateway (GW) to the service logic of the service control point (SCP) of the intelligent network and a service data parameter and/or the service logic of the intelligent network is modified by using a protocol supported by the second telecommunication network.

7. Method as defined in claim 6, characterised in that a conversion between a fixed-format message as used in the second telecommunication (1) network and a message supported by the service control point (SCP) is performed by using a table in the gateway (GW).

8. Method as defined in claim 6 or 7, characterised in that the service data parameter and/or service logic is modified via a write operation performed by the gateway (GW) in the service logic of the service control point (SCP).

9. Method as defined in any one of claims 6 - 8, characterised in that the second telecommunication network (1) is an IP-based network.

10. Method as defined in any one of claims 6 - 9, characterised in that the second telecommunication network (1) is a digital mobile telephone network.

11. Method for modifying an intelligent network service parameter in a telecommunication system comprising an intelligent network (IN), a service data point (SDP) comprised in the intelligent network, a digital mobile telephone network (1), means for con-

necting the intelligent network to the mobile telephone network and a terminal device (MS) connected to the mobile telephone network, characterised in that the service parameter is transmitted by means of the terminal device (MS) in the form of a text message (SMS) to the gateway (GW), the text message is converted in the gateway into the form of a service parameter of the intelligent network (IN) and transmitted to the data point (SDP).

12. Method as defined in claim 11, characterised in that an acknowledgement message is returned from the service data point (SDP) to the gateway (GW), the acknowledgement message is converted into the form of a text message (SMS) and sent to the terminal device (MS).

13. Method as defined in claims 11 or 12, characterised in that the record to be modified in the service data point (SDP) is identified in the gateway (GW) by the calling subscriber number of the text message (SMS).

14. Method as defined in any one of claims 11 - 13, characterised in that the record to be modified in the service data point (SDP) is identified in the gateway (GW) by the contents of the text message (SMS).

15. Method as defined in any one of claims 11 - 14, characterised in that the information (SMS) is transmitted between the terminal device (MS) and the gateway (GW) in the form of a short message.

16. Method as defined in any one of claims 11 - 15, characterised in that the information (SMS) is transmitted between the terminal device (MS) and the gateway (GW) by using the USSD protocol.

17. Method as defined in any one of claims 11 - 16, characterised in that the information (SMS) is transmitted between the terminal device (MS) and the gateway (GW) by using the WAP protocol.

18. Telecommunication system for modification and transmission of intelligent-network service data or service parameters, said system comprising an intelligent network (IN), a service control point (SCP) comprised in the intelligent network, a service data point (SDP) comprised in the intelligent network, a second telecommunication network (1) and means for connecting the intelligent network to the second telecommunication network, characterised in that the system comprises a gateway (GW) for connecting the second telecommunication network to the service logic of the service control point (SCP) and/or to the service data point (SDP) and means (9, 14) for modification of a service data parameter and/or the service logic of the intelligent network by using a protocol supported by the second telecommunication network (1).

19. System as defined in claim 18, characterised in that the gateway (GW) comprises table means (10) for performing a conversion between a fixed-format message supported by the second telecommunication network (1) and a message supported by the intelligent network (IN).

20. System as defined in claim 18 or 19, characterised in that the gateway (GW) comprises means (11) for carrying out a write operation in the service logic of the service control point (SCP) or in the service data point (SDP) and means (12) for modification of the service data parameter and/or service logic.

21. System as defined in any one of claims 18 - 20, characterised in that the second telecommunication network (1) is an IP-based network.

22. System as defined in any one of claims 18 - 21, characterised in that the second telecommunication network (1) is a digital mobile telephone network.

23. Telecommunication system for modification of intelligent network services or service logic, said system comprising an intelligent network (IN), a service control point (SCP) comprised in the intelligent network, a second telecommunication network (1) and means for connecting the intelligent network to the second telecommunication network, characterised in that the system comprises a gateway (GW) for connecting the second telecommunication network (1) to the service logic of the service control point (SCP) and means (9) for modification of a service data parameter and/or the service logic of the intelligent network by using a protocol supported by the second telecommunication network.

24. System as defined in claim 23, characterised in that the gateway (GW) comprises table means (10) for performing a conversion between a fixed-format message supported by the second telecommunication network (1) and a message supported by the intelligent network (IN).

25. System as defined in claim 23 or 24, characterised in that the gateway (GW) comprises means (11) for performing a write operation in the service logic of the service control point (SCP) and means (12) for modification of the service data parameter and/or service logic.

26. System as defined in any one of claims 23 - 25, characterised in that the second telecommunication network (1) is an IP-based network.

27. System as defined in any one of claims 23 - 26, characterised in that the second telecommunication network (1) is a digital mobile telephone network.

28. Telecommunication system for modification of an intelligent network service parameter, said system comprising an intelligent network (IN), a service data point (SDP) comprised in the intelligent network,

a digital mobile telephone network (1), means for connecting the intelligent network to the mobile telephone network and terminal equipment (TE) connected to the mobile telephone network, characterised in that the system comprises means (13) for sending the service parameter in the form of a text message (SMS) from the terminal equipment (TE) to a gateway (GW), means (14) for converting the text message in the gateway into the form of a service parameter of the intelligent network (IN) and transmitting it to the service data point (SDP).

29. System as defined in claim 28, characterised in that the system comprises means (15) for returning an acknowledgement message from the service data point (SDP) to the gateway (GW), means (16) for converting the acknowledgement message in the gateway into the form of a text message (SMS) and sending it to the terminal equipment (TE).

30. System as defined in claim 28 or 29, characterised in that the gateway (GW) comprises means (17) by which the record to be modified in the service data point (SDP) is identified by the calling subscriber number of the text message (SMS).

31. System as defined in any one of claims 28 - 30, characterised in that the gateway (GW) comprises means (18) by which the record to be modified in the service data point (SDP) is identified by the contents of the text message (SMS).

32. System as defined in any one of claims 28 - 31, characterised in that the system comprises means (19) for transmission of information (SMS) between the terminal equipment (TE) and the gateway (GW) by using a short message.

33. System as defined in any one of claims 28 - 32, characterised in that the system comprises means (20) for transmission of information

(SMS) between the terminal equipment (TE) and the gateway (GW) by using the USSD protocol.

34. System as defined in any one of claims 28 - 32, characterised in that the system comprises means (20) for transmission of information (SMS) between the terminal equipment (TE) and the gateway (GW) by using the WAP protocol.

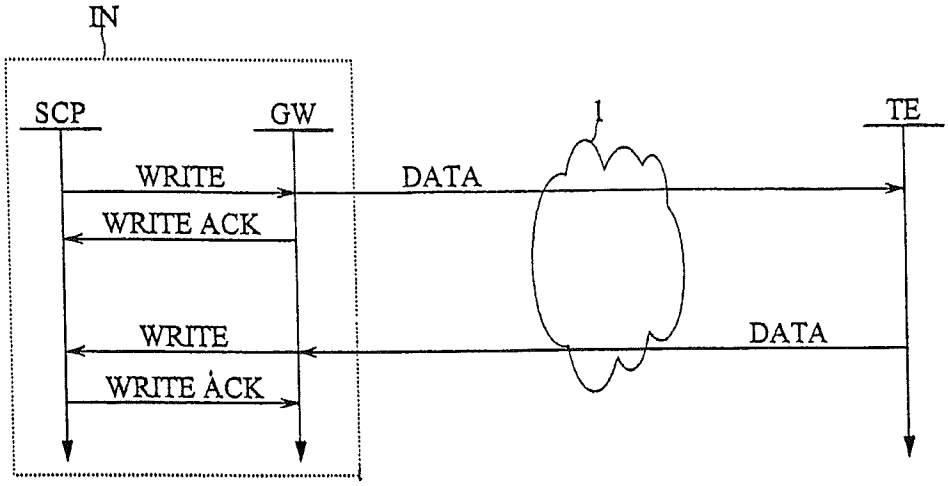
IN
SCP
GW
1
TE
WRITE
DATA
WRITE ACK
WRITE
DATA
WRITE ACK

Fig. 1

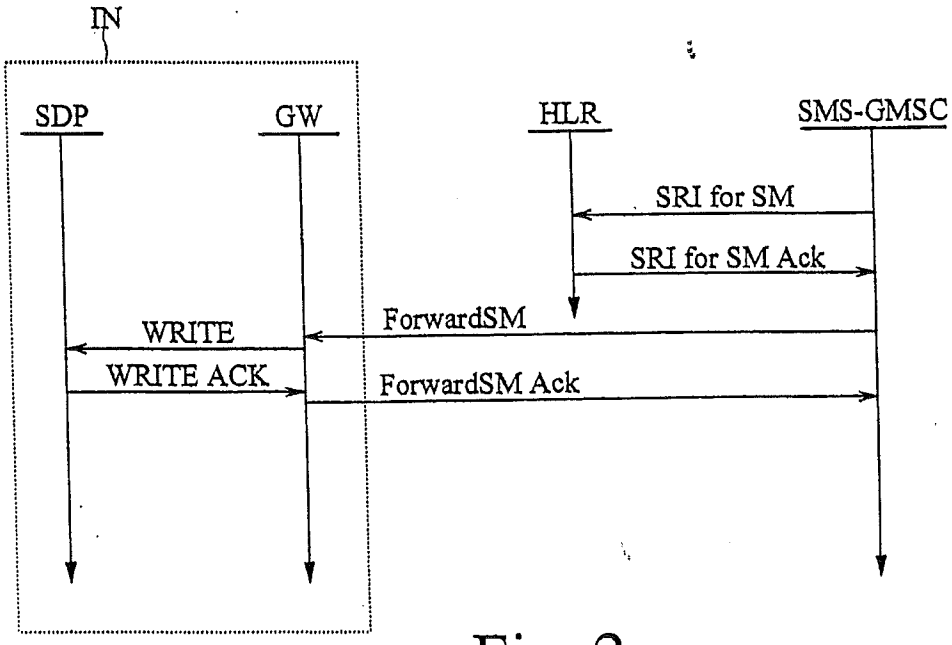
IN
SDP
GW
HLR
SMS-GMSC
SRI for SM
SRI for SM Ack
ForwardSM
WRITE
WRITE ACK
ForwardSM Ack

Fig. 2

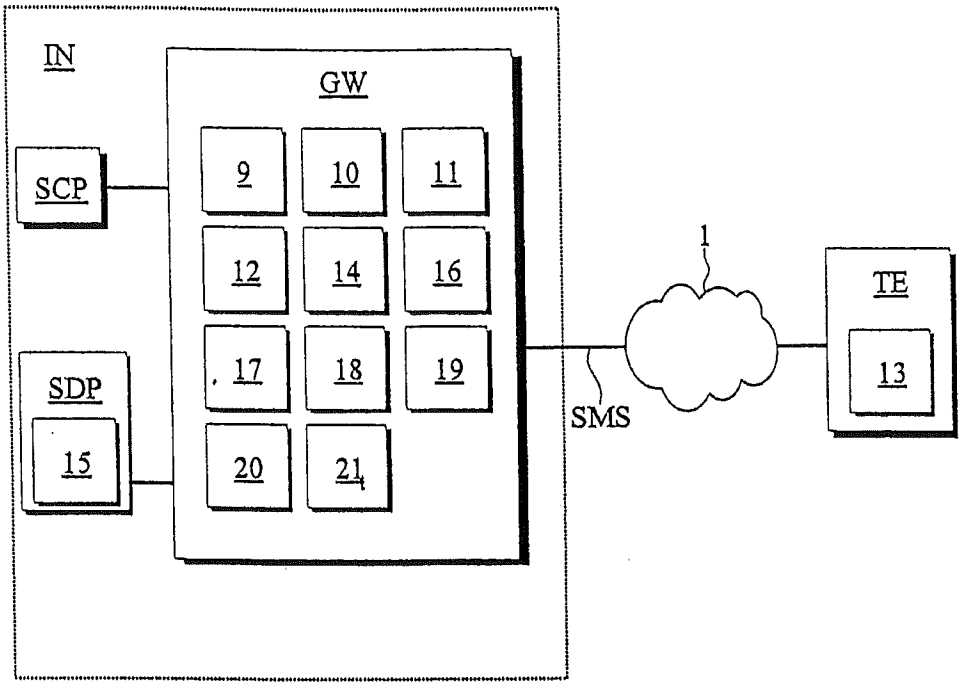

Fig. 3